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Indian Standard
ELECTROTECHNICAL VOCABULARY
PART XLVIII RECORDING
Section 2 Disk Recording

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PART XLVIII RECORDING

Section 2 Disk Recording

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(Continued on page 2)

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*Indian Standard***ELECTROTECHNICAL VOCABULARY****PART XLVIII RECORDING****Section 2 Disk Recording****0. FOREWORD**

0.1 This Indian Standard (Part XLVIII/Section 2) was adopted by the Indian Standards Institution on 22 June 1978, after the draft finalized by the Basic Standards on Electronics and Telecommunication Sectional Committee in consultation with the Recording Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 Originally IS : 1885 (Part III/Sec 3)-1967* covered the terms relating to sound recording and reproduction and is now being superseded by this standard.

0.3 While preparing this standard assistance has been derived from IEC Pub 50 (806)-1975 'International Electrotechnical vocabulary, Chapter 806 : Recording and reproduction of sound and video' issued by International Electrotechnical Commission.

1. SCOPE

1.1 This standard (Part XLVIII/Section 2) covers terms relating to disk recording and reproduction.

2. GENERAL TERMS

2.1 For general terms relating to disk recording [see 2 of IS : 1885 (Part XLVIII/Sec 1)-1978†].

3. DISK

3.1 Disk (Record) — A piece of plastic material in the form of a disk on which a modulation is mechanically recorded.

*Electrotechnical vocabulary: Part III Acoustics, Section 3 Sound recording and reproduction.

†Electrotechnical vocabulary: Part XLVIII Recording, Section 1 Tape recording.

3.2 Groove — A track in the form of a spiral with or without modulation, inscribed or moulded in the surface of a disk.

3.3 Internal Groove Sidewall — The groove wall nearer to the centre of the disk.

3.4 External Groove Sidewall — The groove wall nearer to the external rim of the disk.

3.5 Groove Width — The radial distance between the intersections of the groove sidewalls and the surface plane of the disk.

3.6 Groove Depth — The perpendicular distance from the disk surface to the groove bottom.

3.7 Groove Angle — The included angle between the two sidewalls of the groove of a disk measured in a radial plane perpendicular to the disk surface.

3.8 Bottom Radius — The radius of the bottom of a groove.

3.9 Groove Shape — The cross section of the groove in a radial plane. It is defined in terms of top width, included angle, and bottom radius.

3.10 Coarse Groove — A groove, the width of which is normally more than 0.15 mm and is cut on disks which are recorded at the rated speed of 78 rev/min.

3.11 Microgroove (Fine Groove) — A groove of small depth and width, normally less than 0.12 mm in width.

3.12 Sputtering — A process sometimes used in the production of the metal master wherein the original is coated with an electric conducting layer by means of an electric discharge in a vacuum.

NOTE — This is done prior to electroplating a heavier deposit.

3.13 Land — The record surface between two adjacent grooves of a mechanical recording.

3.14 Long-Playing Record — A record with an appreciably increased playing time compared to a coarse groove, due to the use of a microgroove at a very fine pitch which is recorded at a rated speed of $33\frac{1}{3}$ rev/min or 45 rev/min.

3.15 Gramophone Record — A processed copy of record disk from which sounds may be reproduced by a mechanical or electro-mechanical system.

3.16 Transcription Record — A record made for programme exchange between broadcasting organizations and for other specialized purposes and not normally on sale to the public.

3.17 Pitch — The reciprocal of the number of grooves per unit width.

NOTE — The centimetre is generally taken as unit.

3.18 Plain Groove (Blank Groove) — Any length of groove which carries no recording.

3.19 Modulated Groove — A groove containing lateral or vertical, or $45 \times 45^\circ$ stereophonic recording

3.20 Lead-In Groove — A plain groove that starts at the periphery of the record and the pitch of which is greater than the normal recording pitch.

3.21 Lead-Out Groove — A plain groove which follows the modulated groove, whose pitch is greater than the normal recording pitch.

3.22 Finishing Groove — A plain circular groove which follows the lead-out groove.

3.23 Lead-Over Groove — A spiral groove connecting two sections or bands of a disk.

3.24 Eccentric Groove — A circular groove, the centre of which is not coincident with the normal axis of rotation of the disk.

3.25 Locked Groove (Concentric Groove) — An unmodulated locked continuous circular groove whose centre is coincident with the centre of the recording spiral. It follows a modulated groove and is used for the purpose of preventing further inward or outward movement of the pick-up.

3.26 Fast Groove — A unmodulated spiral groove having a pitch that is much greater than that of the recorded grooves.

3.27 Fast Spiral — An unmodulated groove on a disk having a spacing that is much greater than that of the modulated groove.

3.28 Variable Groove Pitch — A groove, the spacing of which varies in relation to the lateral and/or vertical modulation displacement of the cutting stylus.

3.29 Variable Groove Depth — A groove, the average depth of which varies in relation to the lateral and/or vertical amplitude of the modulation.

3.30 Grouping — The non-uniformity in spacing between the spiral grooves of a disk caused by an irregular motion of the recording lathe feed screw.

3.31 Recorded Surface (Modulated Section) — The portion of the surface of a disk containing modulation.

3.32 Inner Diameter of the Recorded Surface — The diameter of the last modulated groove at the point where the lead-out groove commences.

3.33 Outer Diameter of the Recorded Surface — The diameter of the last groove preceding the first modulated groove.

3.34 Marker Space — A portion of the recorded surface where the groove pitch has been increased to mark the separation of two successive bands of recording.

3.35 Label Area — The central portion of the disk between the finishing groove and the centre hole.

3.36 Groove Guard — The raised outer rim and label area on a disk, used to prevent damage to the recorded surfaces when they are placed in contact with others on an automatic record changer.

3.37 Anti-slip Serrations — Radial serrations in the outer part of the label area to prevent friction and slippage between records, during reproduction, when stacked on the spindle of an automatic record changer.

3.38 Groove Speed — The linear speed of a disk groove with respect to a point such as a recording or reproducing stylus tip.

3.39 Eccentricity — The displacement of the centre of the recording groove spiral with respect to the centre of the disk centre hole.

3.40 Moulding — A process of forming, from a metal stamper, identical recorded plastic disks.

3.41 Injection Moulding — A process of forming a disk by injection of a liquefied plastic material in a cavity.

3.42 Compressing Moulding — A process of forming a disk by compressing a charge of suitable plastic in a cavity.

3.43 Plastic — A resin or polymer suitable for moulding disks by application of heat to the mould cavity.

3.44 Granules — Small plastic grains manufactured to be used in moulding disks.

3.45 Binder — A resinous material which serves to bind the various component materials of a disk.

3.46 Pressing

- a) A record produced in a record moulding press from a master or a stamper.
- b) A particular process of moulding and by extension the whole techniques of disk forming obtained by this process.

3.47 Biscuit — A small slab of plastic material for use in the compression moulding of disks.

3.48 Filler — An inert material in a disk compound which is used as an extender in the plastic material.

3.49 Lacquer Disk — A disk intended for recording, consisting of a solid substrate coated with a plasticized cellulose nitrate lacquer.

3.50 Acetate Disk — A mechanical recording disk, either solid or laminated, which is made of various acetate compounds.

3.51 Laminated Disk — A mechanical recording medium composed of several layers of material. Normally, it is made with a thin face of surface material on each side of a core.

3.52 Wax — A disk of wax on which an original mechanical recording may be inscribed.

3.52.1 Cake Wax — A thick disk of wax upon which an original mechanical disk recording may be inscribed.

3.52.2 Flowed Wax — A mechanical recording medium, in disk form, prepared by melting and flowing wax onto a metal base.

3.53 Processed Disk Record — A disk produced in a moulding press from a stamper.

3.54 Silvering — The process of providing a metallic silver coating on the surface of a lacquer original to enable a metal master or stamper to be formed by subsequent electroplating.

3.55 Shell — Any direct or indirect metal copy of a lacquer disk formed by electroplating.

3.56 Instantaneous Recording — A disk which is cut and intended for direct reproduction.

3.57 Blank — A metal disk covered with lacquer used for reproduction of the original recording.

3.58 Lacquer Original — An instantaneous recording from which a metal master is produced by an electroplating process.

3.59 Wax Original — An original recording on a wax surface for the purpose of making a master.

3.60 Master Negative (Master Original) — A metal master produced by an electroplating process from a lacquer original. It is used to generate further metal moulds by subsequent electroplating.

3.61 Post Negative — A stamper generated from a lacquer original.

3.62 Metal Positive Mother — A direct electroplated copy of a negative. It has a groove similar to that on a disk and can be played as such.

3.63 Stamper — A negative metal part generated by an electroplating process from which finished pressings are moulded.

A stamper can be generated either from a metal positive (mother) or from a lacquer original.

3.63.1 Backed Stamper — A thin metal stamper which is attached to a backing material, generally a metal disk of desired thickness.

3.64 Flash — An unwanted moulding material at the edge of a disk, formed during the compression moulding operation.

3.65 Click (Pop) — A spurious sharp noise generated when reproducing a disk.

3.66 Crackle — A spurious noise perceived as a series of crackling sounds when reproducing a disk.

3.67 Cyclic Noise (Swish) — A spurious noise perceived at each revolution of the disk during playback.

3.68 Horns of a Groove — The edges of a groove raised undesirably above the disk surface due to an embossing effect when recording.

3.69 Unfill (Blow-Hole) — A fault of the upper part of the groove edges caused by lack of material during moulding.

3.70 Moire Pattern (Patterning) — An abnormal watered aspect of the recorded surface, due to a very low frequency modulation of the width and depth of the groove, produced during cutting.

3.71 Warp of a Disk — A distortion or twist in a normally flat disk.

3.72 Lateral Recording — A recording in which the movement of the cutting stylus is parallel to the surface of the recording medium.

3.73 Vertical Recording (Hill-and-Dale Recording) — A recording in which the movement of the recording stylus is perpendicular to the surface of the recording medium.

3.74 Constant Amplitude Recording — A recording such that, for a constant amplitude sinusoidal signal, the resulting recorded amplitude is independent of the frequency.

3.75 Constant Velocity Recording — A recording such that, for a constant amplitude sinusoidal signal, the resulting recorded amplitude is inversely proportional to the signal frequency.

3.76 Monophonic Record — A record which carries one channel of information in the form of lateral displacement of a spiral groove.

3.77 Stereophonic Record — A record which carries two channels of information in the form of displacements of a single spiral groove in two mutually perpendicular directions.

NOTE — In stereophonic $45 \times 45^\circ$ recording, the modulation axes intersect at right angles and each of them is inclined at 45° to the surface of the recording medium.

3.78 Frequency Record — A disk on which are recorded various sinewave signals, at stated frequencies and levels, for the purpose of measuring the reproducing system characteristics.

3.79 Trial Record — A record for evaluating the quality of a pressing before release.

4. DISK RECORDING

4.1 Mechanical Recording — A recording process, wherein recorded signals are embodied in the form of a permanent mechanical set on a recording support by cutting, embossing or moulding.

4.2 Cutting on Disk — The process of converting audiofrequency signals, usually previously recorded on magnetic tape, into a modulated spiral groove which is cut into a blank disk by electromechanical means, the modulation characteristic being determined by the signal to be recorded.

4.3 Disk Recorder — A mechanical device consisting of a turntable capable of being rotated at a constant velocity, and a cutter head mounted above the turntable, actuated by a radial movement, to enable a spiral groove to be cut in a disk.

4.4 Cutter Head (Mechanical Recording Head) — An electromechanical transducer which transforms electrical signals into mechanical displacements which modulate the spiral groove being cut in the disk by a cutting stylus.

4.5 Cutting Stylus (Recording Stylus) — A specially-shaped tool, made of a very hard material, used to cut the modulated spiral groove on a lacquer or wax disk.

4.5.1 Embossing Stylus — A recording stylus which forms the groove in the recording medium by displacing material.

4.6 Crystal Cutter Head — A cutter head in which the displacements of the recording stylus are derived from the deformations of a piezoelectric material.

4.7 Magnetic Cutter Head — A cutter head in which the displacements of the recording stylus are directly generated by electromagnetic or electrodynamic forces.

4.8 Electrodynamic Cutter Head — A cutter head in which the displacements of the recording stylus are generated by the motion of a coil in a magnetic field.

4.9 Feedback Cutter Head — A cutter head, the output of which is linearized by the action of feedback signals injected from the cutter head into the recording amplifier circuit.

4.10 Advance Ball — A rounded support attached to a cutter head which rests on the surface of the disk so as to maintain a uniform depth of cutting.

4.11 Surface Burnishing Face — The portion of the cutting stylus directly behind the cutting edge intended for polishing the groove walls.

4.12 Core — The central layer of basic support of certain types of laminated media.

4.13 Drive Pin — An eccentrically located pin on the turntable, intended to fit into a suitable hole on the record to prevent it from slipping on the turntable.

4.14 Drive-Pin Hole — A hole in a disk record which accommodates the turntable drive pin.

4.15 Chip (Swarf) — The material removed from the disk by the recording stylus while cutting the groove.

4.16 Overcutting — A fault caused by an excessive level during recording and characterized by one groove cutting in an adjacent one.

4.17 Record Player — A mechanical device of a reproducing equipment consisting of a turntable with its driving system, a tone arm and a pick-up head.

4.18 Gramophone (Phonograph) — An electroacoustic device including a record player, an amplifying system and one or more built-in or separate loudspeakers.

4.19 Record Changer — A mechanism for placing a series of disks one after another automatically on the turntable of a reproducing system so that they can be played in a given order.

4.20 Record Spindle — A device for the purpose of stacking disks and which may be equipped with mechanical means to drop one record at a given time on the turntable.

4.21 Record-Stacking Height — The available height reserved for stacking disks on the vertical spindle of a record changer.

4.22 Drive Mechanism — An electromechanical mechanism actuating the turntable of a recording or reproducing equipment.

4.23 Turntable — A circular plate rotated by a driving mechanical and supporting a disk which is being used for reproduction or recording.

4.23.1 Turntable (Automatic) — A unit composed of a driving system, a turntable, a tone arm, a pick-up cartridge, but without amplifier and electroacoustic transducer, used for reproducing recorded disk.

4.24 Vacuum Chuck Turntable — A turntable which holds a disk by means of a suction device so that it will remain as flat as possible.

4.25 Pick-Up Head (Reproducing Head) — An electromechanical transducer which, when actuated by the groove modulation, converts a mechanical signal input to an electrical signal output.

4.25.1 Ceramic Pick-Up Head — A pick-up head which depends for its operation upon the piezoelectric properties of ceramic material.

4.25.2 Crystal Pick-Up Head — A pick-up head which depends for its operation upon the piezoelectric properties of certain crystalline materials.

4.25.3 Electrodynamic Pick-Up Head — A pick-up head which depends for its operation upon the motion of a coil in a magnetic field.

4.25.4 Capacitance Pick-Up Head — A pick-up head which depends for its operation upon the variation in capacitance of an electric circuit.

4.25.5 Magnetic Variable Reluctance Pick-Up Head — A pick-up head which depends for its operation upon the variation in reluctance of a magnetic circuit.

4.25.6 Magnetodynamic Pick-Up Head — A pick-up head which depends for its operation upon the motion of a magnet with respect to a fixed coil.

4.25.7 Variable Resistance Pick-Up — A pick-up which depends for its operation upon the variations of electrical resistance.

4.25.8 Variable Inductance Pick-Up — A pick-up which depends for its operation upon the variations of inductance.

4.25.9 Moving Iron Pick-Up — Under consideration.

4.26 Reproducing Stylus Tip — A mechanical transmission element consisting of a suitable tip to follow the modulation of a recorded groove and a means for transferring the resultant vibrations to the pick-up head.

NOTE — The above expression is commonly applied to a unit composed of a stylus tip and its mounting.

4.27 Elliptic Reproducing Stylus Tip — A stylus tip having an elliptic cross section. The major axis of the ellipse is at right angles to the direction of the groove travel.

4.28 Included Angle of a Reproducing Stylus Tip — The acute angle between the straight sides of the stylus cone measured in a plane through the axis of the cone.

4.29 Effective Stylus Tip Radius — The radius of a circle formed by the intersection of the stylus tip and a plane parallel to the record surface, located at the points of contact between the stylus tip and the groove walls.

NOTE — In the case of an elliptic stylus tip, it is the radius of curvature of the portions of the stylus tip in contact with the groove sidewalls in a plane parallel to the record surface.

4.30 Stylus Drag (Needle Drag) — The force resulting from the friction between the surface of the disk and the reproducing stylus.

4.31 Gramophone Needle — A detachable reproducing stylus in the form of a needle usually of steel or fibre.

4.32 Stylus Force — The force exerted by a stylus tip on the groove of a disk.

4.33 Pick-Up Cartridge — A removable pick-up head.

4.34 Moving Armature — The whole of the pick-up cartridge mobile element mechanically interdependent of the reproducing stylus tip.

4.35 Pick-Up Arm (Tone Arm) — A bar pivoting at one end, and holding the pick-up head at the other end, to allow the stylus tip to follow the groove in the surface of the disk.

4.36 Counterweight of a Tone Arm — A mass located behind the pivot of the tone arm and the purpose of which is to permit adjustment of the stylus force.

4.37 Acoustic Pick-Up or Sound Box — A device which transforms groove modulations directly into acoustic vibration.

4.38 Reject Control — A manual control, the purpose of which is to interrupt the playing or selection of a disk at any time, to play the next record on the spindle, or to return the pick-up arm to its rest position.

4.39 Automatic Stop — A device for automatically stopping the turntable rotation on reproducing equipment at the end of the groove.

4.40 Compliance — The ratio of the reproducing stylus tip displacement to the force applied to that same point which generated the displacement. It is expressed in millimetres per newton.

NOTE — Both vertical and horizontal compliance can be stated.

4.41 Stiffness — The reciprocal of compliance. It is expressed in newtons per millimetre.

4.42 Tracking Ability — The minimum stylus force required to maintain contact between the reproducing stylus tip and both groove walls on a given test record.

4.43 Rake of Stylus (Recording Angle or Dig) — The angular deviation between the longitudinal axis of the stylus and a line perpendicular to the disk surface, both of which lie in a plane perpendicular to the record surface and tangent to the groove motion at the stylus tip.

4.44 Camber of a Stylus (List of a Stylus) — The angular deviation between the longitudinal axis of the stylus and a line perpendicular to the disk surface, both of which lie in a plane perpendicular to the record surface and to the groove motion at the stylus tip.

4.45 Effective Mass of the Stylus Tip — The ratio of a force applied to a reproducing stylus tip to the acceleration generated by that force.

4.46 Side Thrust — The radial component of the force of a pick-up arm due to the friction between the stylus tip and the groove wall.

4.47 Tripping Force — The force required to trip the return mechanism in an automatic record player.

4.48 Compatibility

- a) A mechanical characteristic of a pick-up head which enables it to reproduce without damage the modulation of a monophonically or stereophonically recorded groove.
- b) A characteristic of the groove modulation which enables it to be played monophonically or stereophonically.

4.49 Surface Noise — A noise component in the electrical output of a pick-up head due to irregularities in the surface of the groove walls at the points of stylus tip contact.

4.50 Rumble in a Record Player Unit — A low frequency vibration mechanically transmitted to the recording or reproducing turntable and superimposed on the reproduction of the recorded signal.

4.51 Rumble Level — The ratio expressed in decibels, of the voltage derived from a low frequency vibration with the unit, measured at a given output, to the voltage derived from a reference signal intended for, and measured at the same output.

NOTE — It can be expressed either as a weighted, or an unweighted value.

4.52 Hum — A voltage at a given output, derived from stray fields in specified conditions, and superimposed on the reproduction of the recorded signal.

4.53 Hum Level — The ratio, expressed in decibels, of the voltage derived from stray fields in specified conditions and measured at a given output, to the voltage derived from a reference signal intended for and measured at the same output.

4.54 Recorded Velocity — The alternating velocity which would be imparted to a stylus tip of negligible dimensions, fitted to a pick-up head having no mechanical impedance when tracing the groove of a record rotating with a constant angular velocity. It is represented by a vector with a lateral and a vertical component for records with stereophonic recording.

NOTE — The recorded velocity may be measured by the Buchmann-Meyer method (light bandwidth method). It should always be stated whether rms or peak values are implied.

4.55 Diameter Equalization — The process of increasing the recording level of high frequencies in order to compensate for reproducing losses which occur towards the centre of the disk.

4.56 Channel Orientation — The operation which consists of connecting channels of a stereophonic reproducing equipment so that the right-hand loudspeaker (s) as viewed from the audience shall be actuated by the groove wall which is further away from the centre of the disk.

4.57 Vertical Modulation Angle — The angle between the perpendicular to the surface of the disk and the direction of the stylus tip movement, measured in the anticlockwise sense, when the pick-up head is viewed from the side, with the stylus tip to the left side of the pick-up arm pivot.

4.58 Offset Angle — The angle measured in the clockwise direction when viewed from above formed by the projection into the plane of the disk of the line joining the pivot of the pick-up arm to the stylus tip and the similar projection of the perpendicular to the tangent plane of vibration of the stylus tip.

4.59 Lateral Tracking Angle Error — The acute angle in the disk plane when reproducing a lateral recording, formed by the tangent to the arc of stylus tip motion, at the point of zero stylus tip displacement, and the radius of the disk passing through the same point of zero stylus tip displacement.

4.60 Vertical Tracking Angle Error — Through the axis of symmetry of the stylus tip and its support, perpendicular to the record surface and viewed from the record centre, the angle between the tangent to the motion curve of the stylus tip and the perpendicular passing through the stylus tip.

4.61 Pinch Effect — The vertical motion of the reproducing stylus tip due to the decrease in the included angle, between the groove walls in a plane perpendicular to the groove and the record surface at the points of the maximum modulation velocity.

4.62 Cross-Talk Between the Spiral Groove — Spurious signals occurring during the reproduction of a disk record due to the intermodulation of two adjacent grooves.

4.63 Shaving — The process of removing material from the surface of a recording medium for the purpose of obtaining a new recording surface.

4.64 Pre-echo — The cross-talk from the adjacent groove following the groove being played.

4.65 Post-echo — The cross-talk from the adjacent groove preceding the groove being played.

4.66 Preform — A small slab of record stock material as it is prepared for use in the record presses.

4.67 Dynamic Distortion — A type of distortion which occurs when the stylus tip, due to its mechanical impedance, deforms the record material and therefore does not accurately trace the groove shape.

4.68 Tracing Distortion — A type of distortion due to the difference in the geometrical forms of the recording stylus tip and the reproducing stylus tip.

4.69 Poid — The curve traced by the centre of a sphere when it rolls or slides over a surface having a sinusoidal profile.

4.70 Transition Frequency — In a disk recording system, the frequency corresponding to the point of intersection of the asymptotes to the constant amplitude and the constant velocity portions of its frequency response curve. This curve is plotted with output voltage ratio in decibels as the ordinate and the logarithm of the frequency as the abscissa.

4.71 Buchmann and Meyer Pattern (Light Bandwidth) — A method of measurement of the levels recorded on test disks which are used for the calibration of disk recording/reproducing equipment. It consists of observing the pattern obtained by the light reflected from a parallel beam at a grazing incidence, from either of the groove walls when the groove is viewed from the direction of the light source.

INDEX

NOTE — This index has been prepared in accordance with IS : 1275-1958*. Index numbers are clause numbers.

A

- Ability, Tracking 4.42
- Acetate disks 3.50
- Acoustic pick-up 4.37
- Advance ball 4.10
- Amplitude recording, Constant 3.74
- Angle
 - error
 - Lateral tracking 4.59
 - Vertical tracking 4.60
 - Groove 3.7
 - of a reproducing stylus tip, Included 4.28
 - Offset 4.5
 - Recording 4.43
 - Vertical modulation 4.57
- Anti-slip serrations 3.37
- Area, Label 3.35
- Arm
 - Counterweight of a tone 4.36
 - Pick-up 4.35
 - Tone 4.35
- Armature, Moving 4.34
- Automatic 4.23.1
 - stop 4.39

B

- Backed stamper 3.63.1
- Bandwidth, Light 4.71
- Ball, Advance 4.10
- Binder 3.45
- Biscuit 3.47
- Blank 3.57
 - groove 3.18
- Blow-hole, Unfil 3.69
- Bottom radius 3.8
- Box, Acoustic sound 4.37
- Buchmann and Meyer pattern 4.71
- Burnishing face, Surface 4.11

C

- Cake wax 3.52.1
- Camber of a stylus 4.44
- Capacitance pick-up head 4.25.4
- Cartridge, Pick-up 4.33
- Ceramic pick-up head 4.25.1
- Changer, Record 4.19

- Channel orientation 4.56
- Chip 4.15
- Chuck turntable, Vacuum 4.24
- Click (pop) 3.65
- Coarse groove 3.10
- Compatibility 4.48
- Compliance 4.40
- Compressing moulding 3.42
- Concentric groove 3.25
- Constant
 - amplitude recording 3.74
 - velocity recording 3.75
- Control, Reject 4.38
- Core 4.12
- Counterweight of a tone arm 4.36
- Crackle 3.66
- Cross-talk between the spiral groove 6.63
- Crystal
 - cutter head 4.6
 - pick-up head 4.25.2
- Cutter head
 - Crystal 4.6
 - Electrodynamic 4.8
 - Feedback 4.9
 - Magnetic 4.7
- Cutting
 - on disk 4.2
 - stylus 4.5
- Cycling noise (Swish) 3.67

D

- Depth
 - Groove 3.6
 - Variable groove 3.29
- Diameter
 - equalization 4.55
 - of the record surface
 - Inner 3.32
 - Outer 3.33
- Dig, Recording 4.43
- Disk
 - Acetate 3.50
 - Cutting on 4.2
 - Lacquer 3.49
 - Laminated 3.51
 - (record) 3.1
 - Processed 3.53
 - recorder 4.3
 - Warp of a 3.71

*Rules for making alphabetical indexes.

Distortion
 Dynamic 4.67
 Tracing 4.68
 Drag
 Needle 4.30
 Stylus 4.30
 Drive
 mechanism 4.22
 pin 4.13
 hole 4.14
 Dynamic distortion 4.67

E

Eccentric groove 3.24
 Eccentricity 3.39
 Effective
 mass of the stylus tip 4.45
 stylus tip radius 4.29
 Effect, Pinch 4.61
 Electrodynamic
 cutter head 4.8
 pick-up head 4.25.3
 Elliptic reproducing
 stylus tip 4.27
 Embossing stylus 4.5.1
 Equalization, Diameter 4.55
 Error
 Lateral tracking angle 4.59
 Vertical tracking angle 4.60
 External groove sidewall 3.4

F

Face, Surface burnishing 4.11
 Fast
 groove 3.26
 spiral 3.27
 Feedback cutter head 4.9
 Filler 3.48
 Fine groove 3.11
 Finishing groove 3.22
 Flash 3.64
 Flowed wax 3.52.2
 Force
 Stylus 4.32
 Tripping 4.47
 Frequency
 record 3.78
 Transition 4.70

G

Gramophone
 needle 4.31
 record 3.15
 Granules 3.44

Groove
 angle 3.7
 Blank 3.18
 Coarse 3.10
 Concentric 3.25
 Cross-talk between the spiral 4.62
 depth 3.6
 Variable 3.29
 Eccentric 3.24
 Fast 3.26
 Fine 3.11
 Finishing 3.22
 guard 3.36
 Horns of a 3.68
 Lead
 in 3.20
 out 3.21
 over 3.23
 Locked 3.25
 Modulated 3.19
 pitch, variable 3.28
 Plain 3.18
 shape 3.9
 sidewall
 External 3.4
 Internal 3.3
 speed 3.38
 width 3.5
 Grouping 3.30
 Guard, Groove 3.36

H

Head
 Capacitance pick-up 4.25.4
 Ceramic pick-up 4.25.1
 Crystal
 cutter 4.6
 pick-up 4.25.2
 Cutter 4.4
 Electrodynamic
 cutter 4.8
 pick-up 4.25.3
 Feedback cutter 4.9
 Magnetic
 cutter 4.7
 variable reluctance
 pick-up 4.25.5
 Magnetodynamic pick-up 4.25.6
 Mechanical recording 4.4
 Pick-up 4.25
 Reproducing 4.25
 Height. Record-stacking 4.21
 Hill-and-dale recording 3.73
 Hole, Drive-pin 4.14
 Horns of a groove 3.68
 Hum 4.52
 level 4.53

I

Included angle of a reproducing stylus tip 4.28
Inductance pick-up, variable 4.25.8
Injection moulding 3.41
Inner diameter of the recorded surface 3.32
Instantaneous recording 3.56
Internal groove sidewall 3.3
Iron pick-up, Moving 4.25.9

L

Label area 3.35
Lacquer
 disk 3.49
 original 3.58
Laminated disk 3.51
Land 3.13
Lateral
 recording 3.72
 tracking angle error 4.59
Lead
 in groove 3.20
 out groove 3.21
 over groove 3.23
Level
 Hum 4.53
 Rumble 4.51
Light bandwidth 4.71
List of a stylus 4.44
Locked groove 3.25
Long-playing record 3.14

M

Magnetic
 cutter head 4.7
 variable reluctance
 pick-up head 4.25.5
Magnetodynamic pick-up head 4.25.6
Marker space 3.34
Mass of the stylus tip,
 Effective 4.45
Master
 negative 3.60
 original 3.60
Mechanical
 recording 4.1
 head 4.4
Mechanism, Drive 4.22
Metal positive mother 3.62
Microgroove 3.11
Modulated
 groove 3.19
 section 3.31
Modulation angle, vertical 4.57

Moire pattern 3.70
Monophonic record 3.76
Mother, Metal positive 3.62
Moulding
 Compressing 3.42
 Injection 3.41
Moving
 armature 4.34
 iron pick-up 4.25.9

N

Needle
 drag 4.30
 Gramophone 4.31
Negative
 Master 3.60
 Post 3.61
Noise
 Cycle 3.67
 Surface 4.49

O

Offset angle 4.58
Orientation, Channel 4.56
Original
 lacquer 3.58
 Master 3.60
 Wax 3.59
Overcutting 4.16

P

Pattern
 Buchmann and Meyer 4.71
 Moire 3.70
Patterning 3.70
Phonograph 4.18
Pick-up
 head 4.25
 Acoustic 4.37
 arm 4.37
 Capacitance 4.25.4
 Cartridge 4.33
 Ceramic 4.25.1
 Crystal 4.25.2
 Electrodynamic 4.25.3
 Magnetic variable reluctance 4.25.5
 Magnetodynamic 4.25.6
 Moving iron 4.25.9
 Variable
 inductance 4.25.8
 resistance 4.25.7
Pin
 Drive 4.13
 hole, Drive 4.14
Pinch effect 4.62

Pitch 3.17
 variable groove 3.28
 Plain groove 3.18
 Plastic 3.43
 Player, Record 4.17
 Poid 4.69
 Pop 3.65
 Positive mother, Metal 3.62
 Post
 echo 4.65
 negative 3.61
 Pre-echo 4.64
 Preform 4.66
 Pressing 3.46
 Processed disk record 3.53

R

Radius
 Bottom 3.8
 Effective stylus tip 4.29
 Rake of stylus 4.43
 Record
 changer 4.19
 Frequency 3.78
 Gramophone 3.15
 Long-playing 3.14
 Monophonic 3.76
 player 4.17
 unit, Rumble in a 4.50
 Processed disk 3.53
 spindle 4.20
 stacking height 4.21
 Stereophonic 3.77
 Transcription 3.16
 Trial 3.79
 Recorded
 surface 3.31
 Inner diameter of the 3.32
 Outer diameter of the 3.33
 velocity 4.54
 Recorder, Disk 4.3
 Recording
 angle on dig 4.43
 Constant
 amplitude 3.74
 velocity 3.75
 head, Mechanical 4.4
 Hill-and-dale 3.73
 Instantaneous 3.56
 Lateral 3.72
 Mechanical 4.1
 stylus 4.5
 Vertical 3.73
 Reject control 4.38
 Reluctance pick-up head
 Magnetic variable 4.25.5

Reproducing
 head 4.25
 stylus tip 4.26
 Elliptic 4.27
 Included angle of a 4.28
 Resistance pick-up, variable 4.25.7
 Rumble
 in a record player unit 4.50
 level 4.51

S

Section, Modulated 3.31
 Serrations, Anti-slip 3.37
 Shape, Groove 3.9
 Shaving 4.63
 Shell 3.55
 Side thrust 4.46
 Sidewall
 External groove 3.4
 Internal groove 3.3
 Silvering 3.54
 Sound box, Acoustic 4.37
 Space, Marker 3.34
 Speed, Groove 3.38
 Spindle, Record 4.20
 Spiral
 Fast 3.27
 groove, cross-talk between the 4.62
 Sputtering 3.12
 Stamber 3.63
 Backed 3.63.1
 Stereophonic records 3.77
 Stiffness 4.41
 Stop, Automatic 4.39
 Stylus
 Camber of a 4.44
 Cutting 4.5
 drag 4.30
 Embossing 4.51
 force 4.32
 List of a 4.44
 Rake of 4.43
 Recording 4.5
 tip
 Effective mass of the 4.45
 Elliptic reproducing 4.27
 Included angle of a reproducing 4.28
 radius, Effective 4.29
 Reproducing 4.26
 Surface
 burnishing face 4.11
 Inner diameter of the recorded 3.32
 noise 4.49
 Outer diameter of the recorded 3.33
 Recorded 3.31
 Swarf 4.15
 Swish 3.67

T

Unit, Rumble in a record player 4.50

Thrust, Side 4.46

Tip

Effective mass of the stylus 4.45

Elliptic reproducing stylus 4.27

Included angle of a reproducing stylus 4.28

radius, Effective stylus 4.29

Reproducing stylus 4.26

Tone arm 4.35

Counterweight of 4.36

Tracing distortion 4.68

Tracking

ability 4.42

angle error

Lateral 4.59

vertical 4.60

Transcription record 3.16

Transition frequency 4.70

Trial record 3.79

Tripping force 4.47

Turntable 4.23

(automatic) 4.23.1

Vacuum chuck 4.24

U

Unfill 3.69

V

Vacuum chuck turntable 4.24

Variable

groove

depth 3.29

pitch 3.28

inductance pick-up 4.25.8

reluctance pick-up head, Magnetic 4.25.5

resistance pick-up 4.25.8

Velocity

Recorded 4.54

recording, Constant 3.75

Vertical

modulation angle 4.57

recording 3.73

tracking angle error 4.60

W

Wax

Cake 3.52.1

Flowed 3.52.2

original 3.59

Width, Groove 3.5